

What is claimed is:

1. An apparatus for measuring local skin impedance, comprising:
  - a multi-channel electrode including a plurality of measurement sensors on an electrode surface having a predetermined area;
  - a channel selector for selecting each of channels included in the multi-channel electrode in response to a channel control signal;
  - a constant current source for applying a predetermined constant current to a region to be measured;
  - a preprocessing unit for amplifying and filtering a potential value measured at each of the channels while the predetermined constant current is flowing through the region to be measured;
  - an analog-to-digital converter for converting the potential value output from the preprocessing unit into a digital signal; and
  - a control unit for generating the channel control signal, for processing the digital signal output from the analog-to-digital converter, and for controlling the entire apparatus.

2. The apparatus as claimed in claim 1, wherein the plurality of measurement sensors is arranged in a matrix shape on the electrode surface.

3. The apparatus as claimed in claim 1, wherein the measurement sensors are pin electrodes made of a metal conductor and include a spring.

4. The apparatus as claimed in claim 1, wherein the multi-channel further comprises twenty-five (25) measurement sensors arranged in a 5 x 5 matrix.

5. The apparatus as claimed in claim 1, wherein a pressure applied to each of the measurement sensors is adjusted depending on a

curvature of the region to be measured during measurement of skin impedance.

6. The apparatus as claimed in claim 1, wherein the multi-channel electrode comprises a micro-electro-mechanical system (MEMS) electrode.

7. The apparatus as claimed in claim 1, wherein the constant current source comprises:

a positive electrode and a negative electrode, which are attached to a location on skin centering around the region to be measured such that the positive and negative electrodes are separated from the region to be measured by a predetermined distance, and the predetermined constant current output from the constant current source is applied to the skin through the positive electrode, then output from the skin through the negative electrode, and then flows back in the constant current source.

8. The apparatus as claimed in claim 1, wherein the preprocessing unit comprises:

a differential amplifier; and

a filter.

9. The apparatus as claimed in claim 8, wherein the filter is a sixth-order Butterworth filter having a cut-off frequency of 4 Hz or less.

10. The apparatus as claimed in claim 1, wherein the control unit comprises:

a personal computer for controlling the apparatus; and

a signal processor for generating the channel control signal and expressing the potential values acquired at each of the channels of the multi-channel electrode as a two-dimensional impedance distribution and a three-dimensional impedance distribution under a control of the personal computer.

11. The apparatus as claimed in claim 10, wherein the signal processor is an analysis software system, which makes it possible to perform a measurement generally performed by an instrument such as an oscilloscope using the personal computer.

12. A method of acquiring a local skin impedance, comprising:  
(a) disposing two electrodes of a constant current source centering around a region to be measured on a patient's skin to be separated from the region to be measured by a predetermined distance and applying a predetermined constant current to the skin through the two electrodes for a predetermined time period;

(b) positioning a multi-channel electrode parallel to the region to be measured and adjusting a measurement pressure; and

(c) applying the predetermined constant current between the two electrodes of the constant current source and measuring skin impedance at

the region to be measured while the predetermined constant current is being applied.

13. The method as claimed in claim 12, wherein the multi-channel electrode comprises:

a plurality of measurement sensors arranged in a matrix shape on an electrode surface having a predetermined area.

14. The method as claimed in claim 12, wherein in (b), the measurement pressure is adjusted depending on a curvature of the region to be measured during measurement of skin impedance.

15. A method of measuring local skin impedance, comprising:  
measuring a potential value at each of a plurality of channels included in a multi-channel electrode disposed between two electrodes of a constant

current source for applying a predetermined constant current to a patient's

skin through the two electrodes;

amplifying and filtering the potential value at each channel;

converting the filtered potential value from an analog format into a digital format; and

analyzing the potential value in the digital format and displaying the results of the analysis in a form of a spatial impedance distribution in two and three dimensions.

16. The method as claimed in claim 15, wherein the multi-channel electrode comprises:

a plurality of measurement sensors arranged in a matrix shape on an electrode surface having a predetermined area.

17. A computer readable medium having embodied therein a computer program for the method of claim 12.

18. A computer readable medium having embodied therein a computer program for the method of claim 14.

19. A computer readable medium having embodied therein a computer program for the method of claim 16.